US008616644B2

(12) **United States Patent**
Lorey

(10) **Patent No.: US 8,616,644 B2**
(45) **Date of Patent: Dec. 31, 2013**

(54) **VEHICLE SEAT WITH SLIDE ELEMENT**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 222 days.

(21) Appl. No.: **13/040,489**

(22) Filed: **Mar. 4, 2011**

(65) **Prior Publication Data**

US 2011/0278894 A1 Nov. 17, 2011

(30) **Foreign Application Priority Data**

Mar. 4, 2010 (DE) 10 2010 010 290

(51) **Int. Cl.**
A47C 1/00 (2006.01)

(52) **U.S. Cl.**
USPC **297/344.15**; 297/344.14

(58) **Field of Classification Search**
USPC 297/344.12, 344.15, 463.1
See application file for complete search history.

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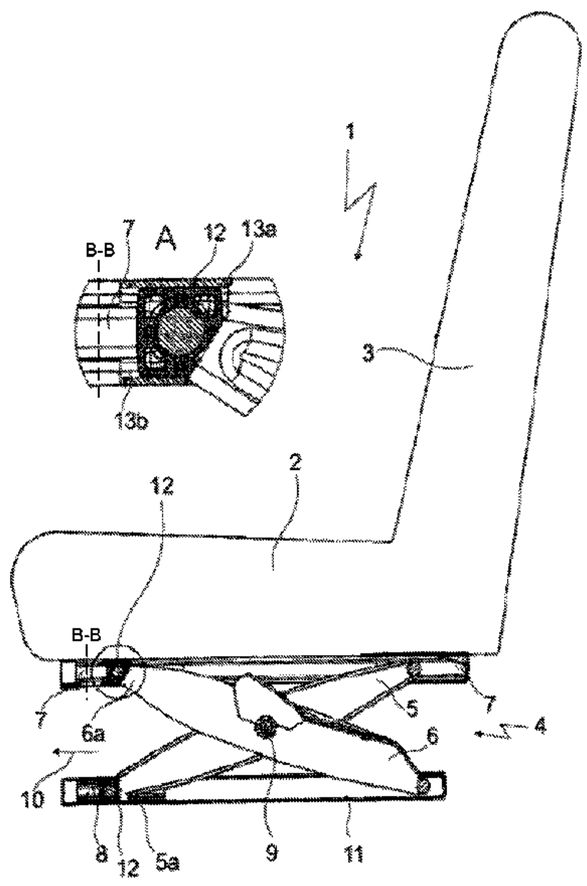
(57) **ABSTRACT**

The invention relates to a vehicle seat with an upper part (**2**, **3**, **7**) comprising a seat part (**2**) and a backrest (**3**), and a lower part (**11**), wherein a vertically adjustable seat frame (**4**) with at least two scissor arms (**5**, **6**) connected to each other in a rotatable manner is arranged between the upper seat part (**2**, **3**, **7**) and the lower seat part (**11**), wherein at least one first end (**5***a*, **6***a*) of at least one of the scissor arms (**5**, **6**) is connected to at least one slide element (**12**) for the displacement—sliding in at least one displacement direction (**10**)—of the first end (**5***a*, **6***a*) along at least one guide rail (**7**, **11**).

9 Claims, 12 Drawing Sheets



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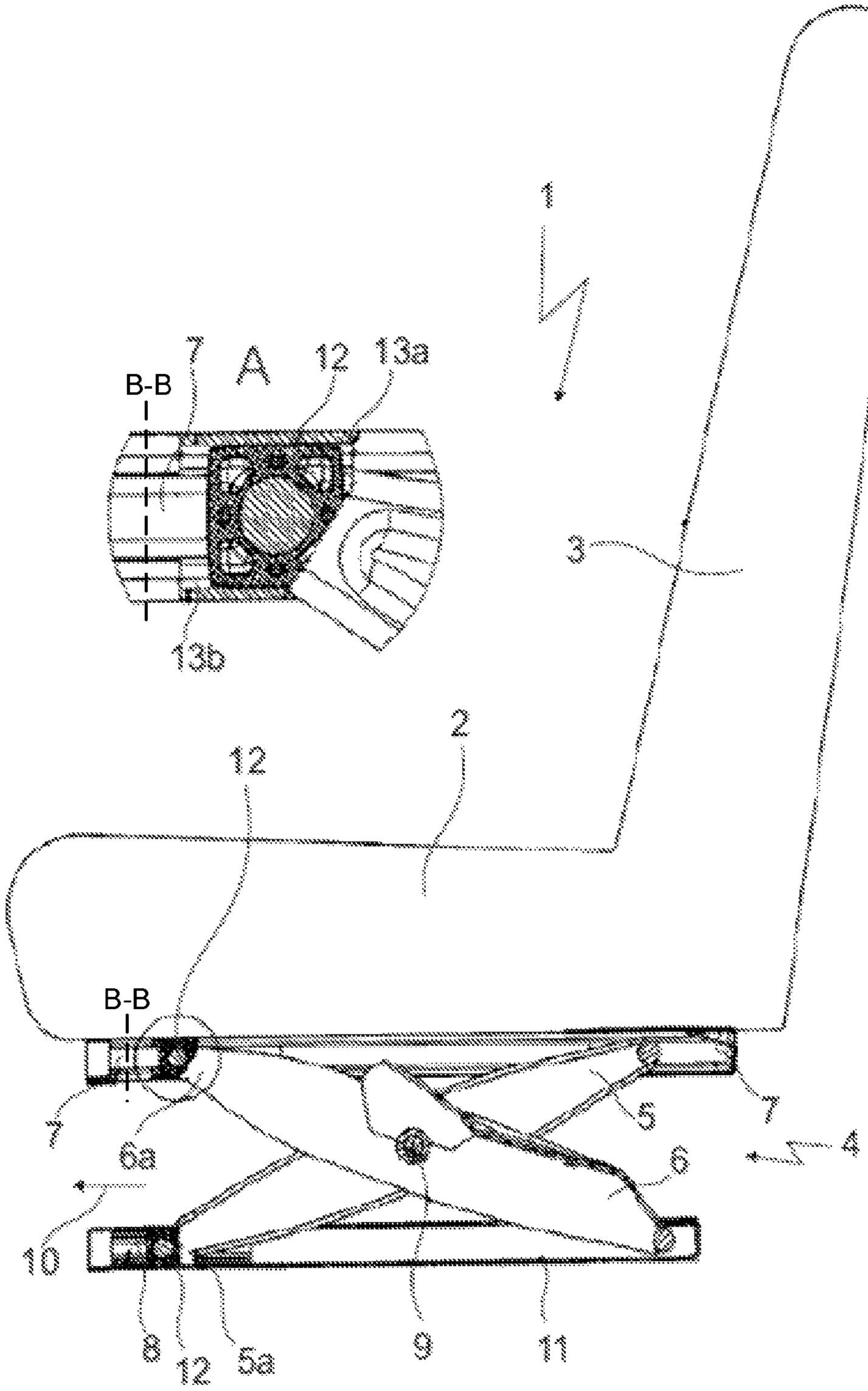

Fig. 1

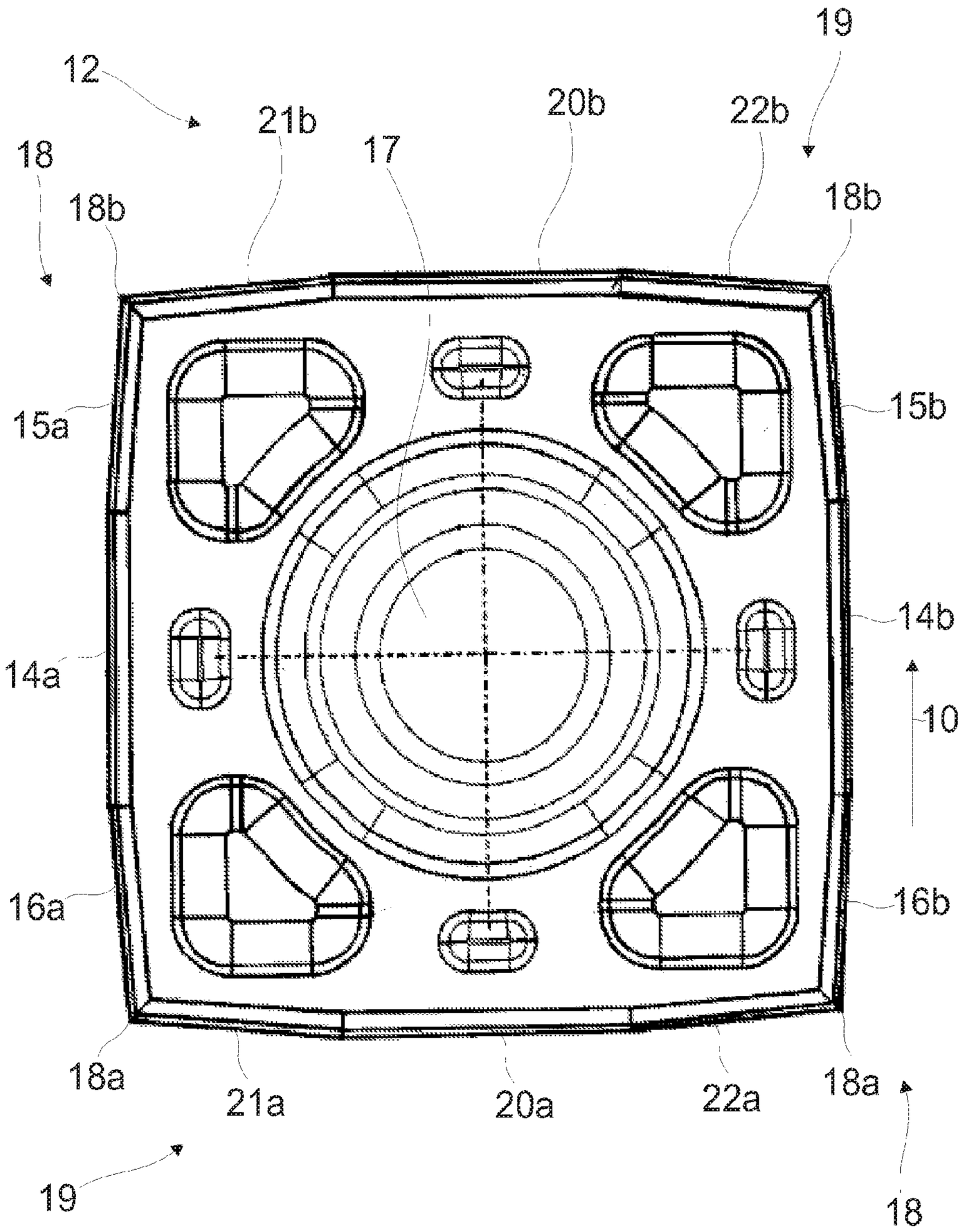
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Fig. 2

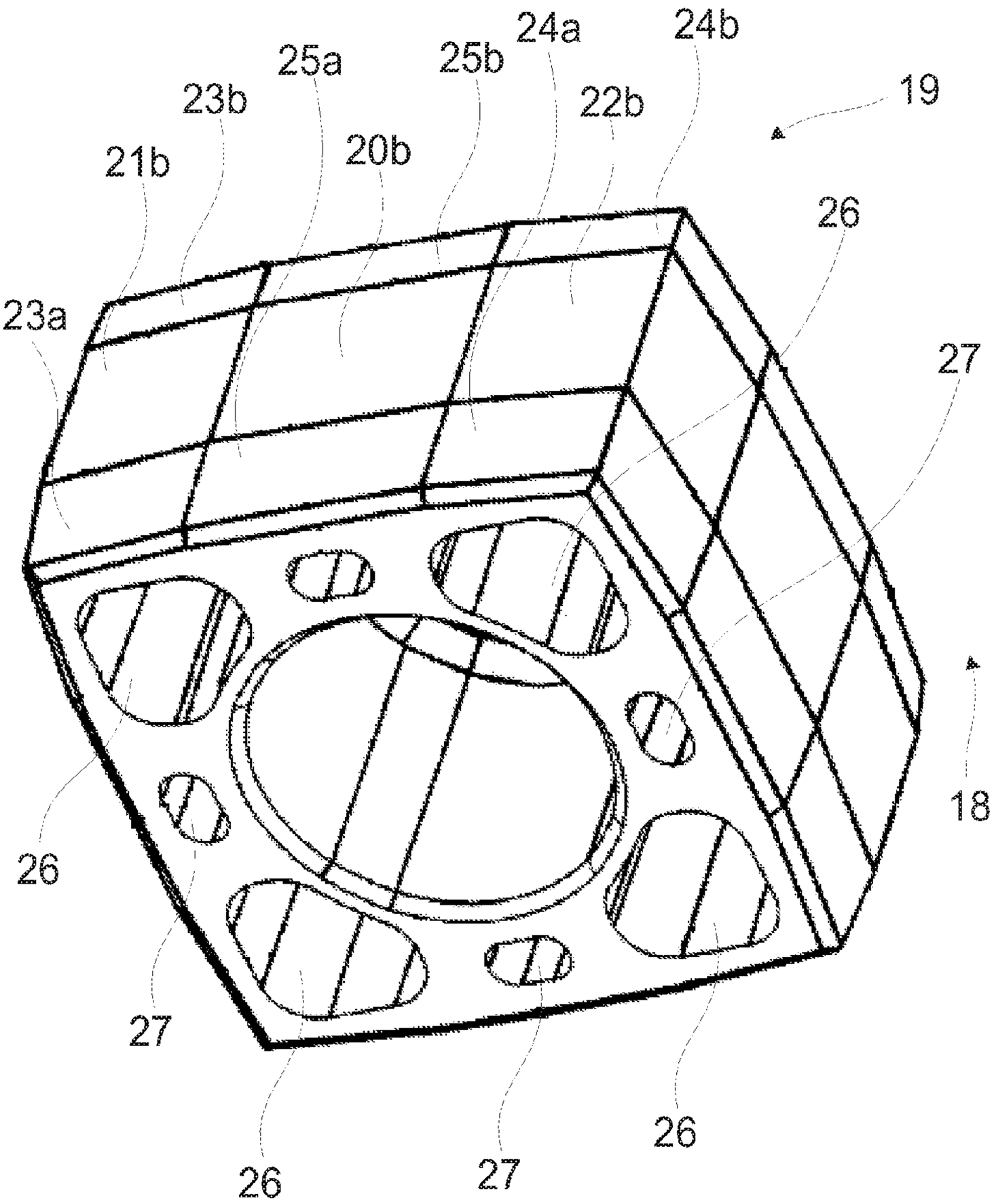
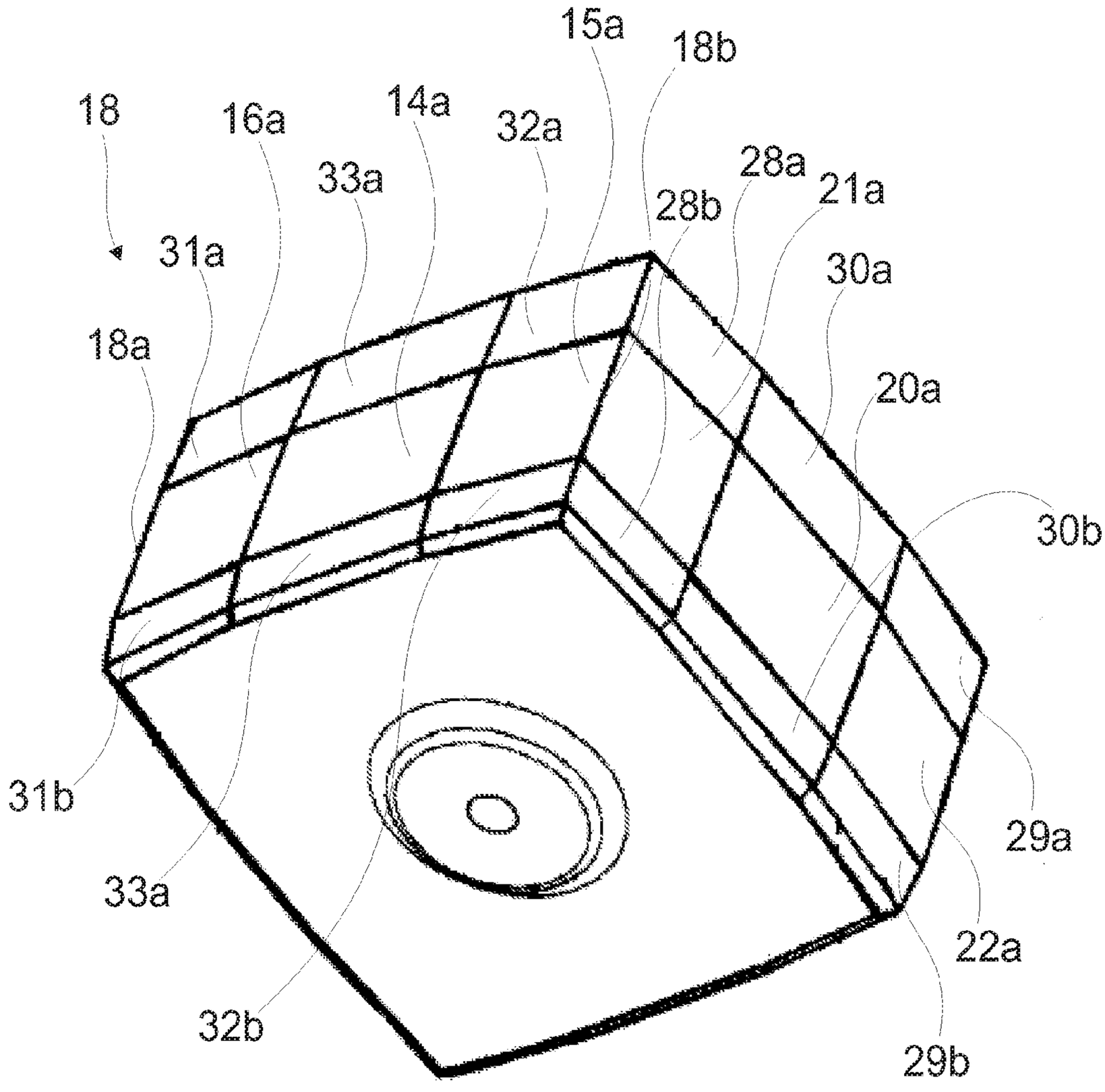


Fig. 3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22a
32b
29b

Fig. 4

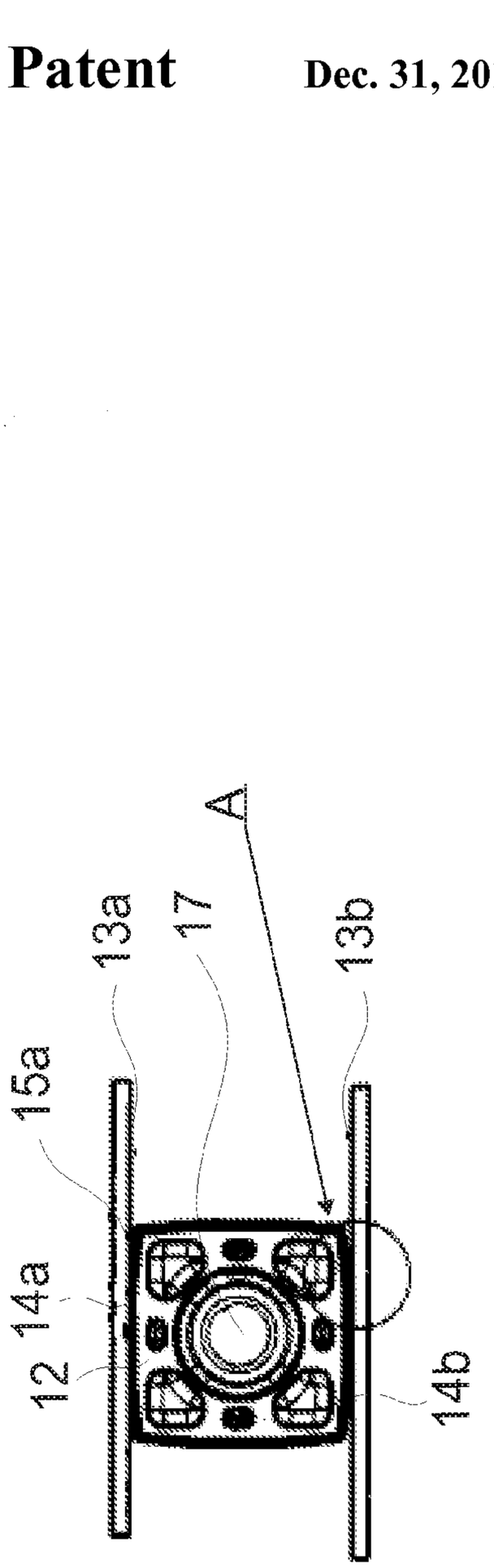


Fig. 5a

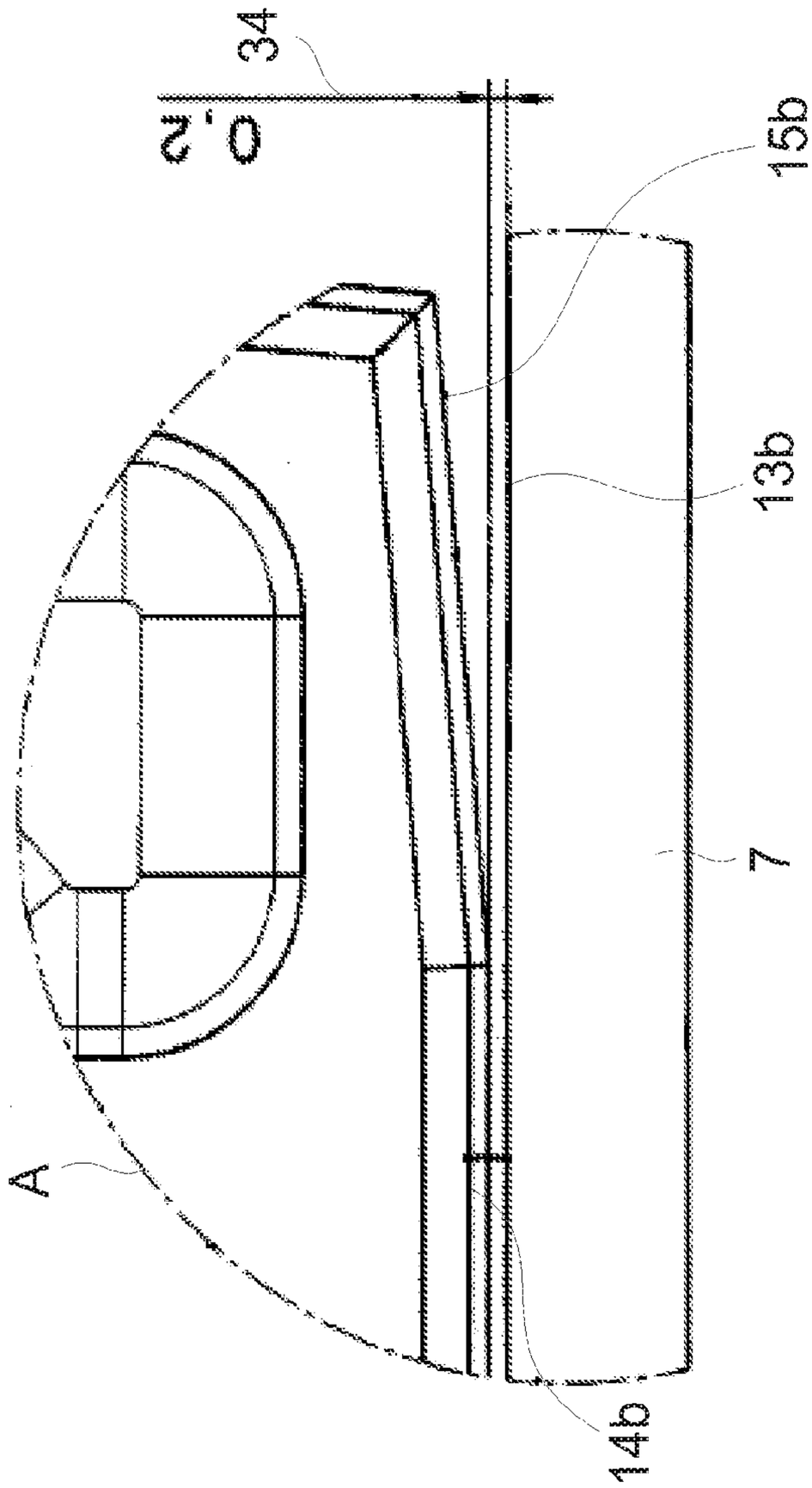


Fig. 5b

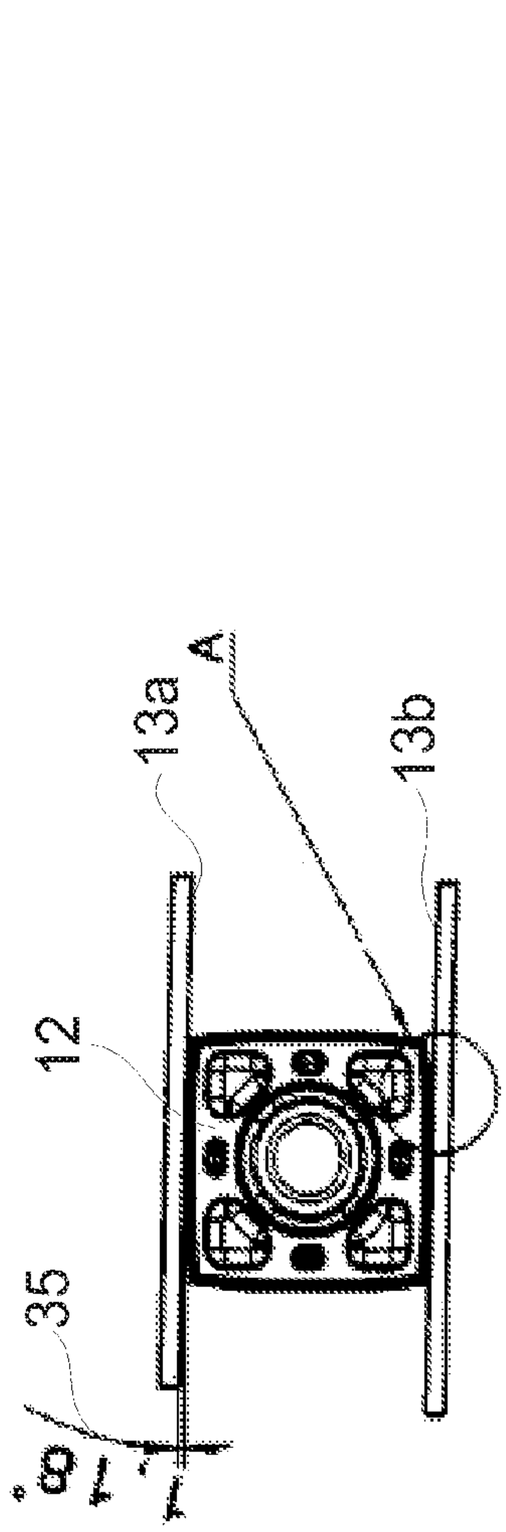


Fig. 6a

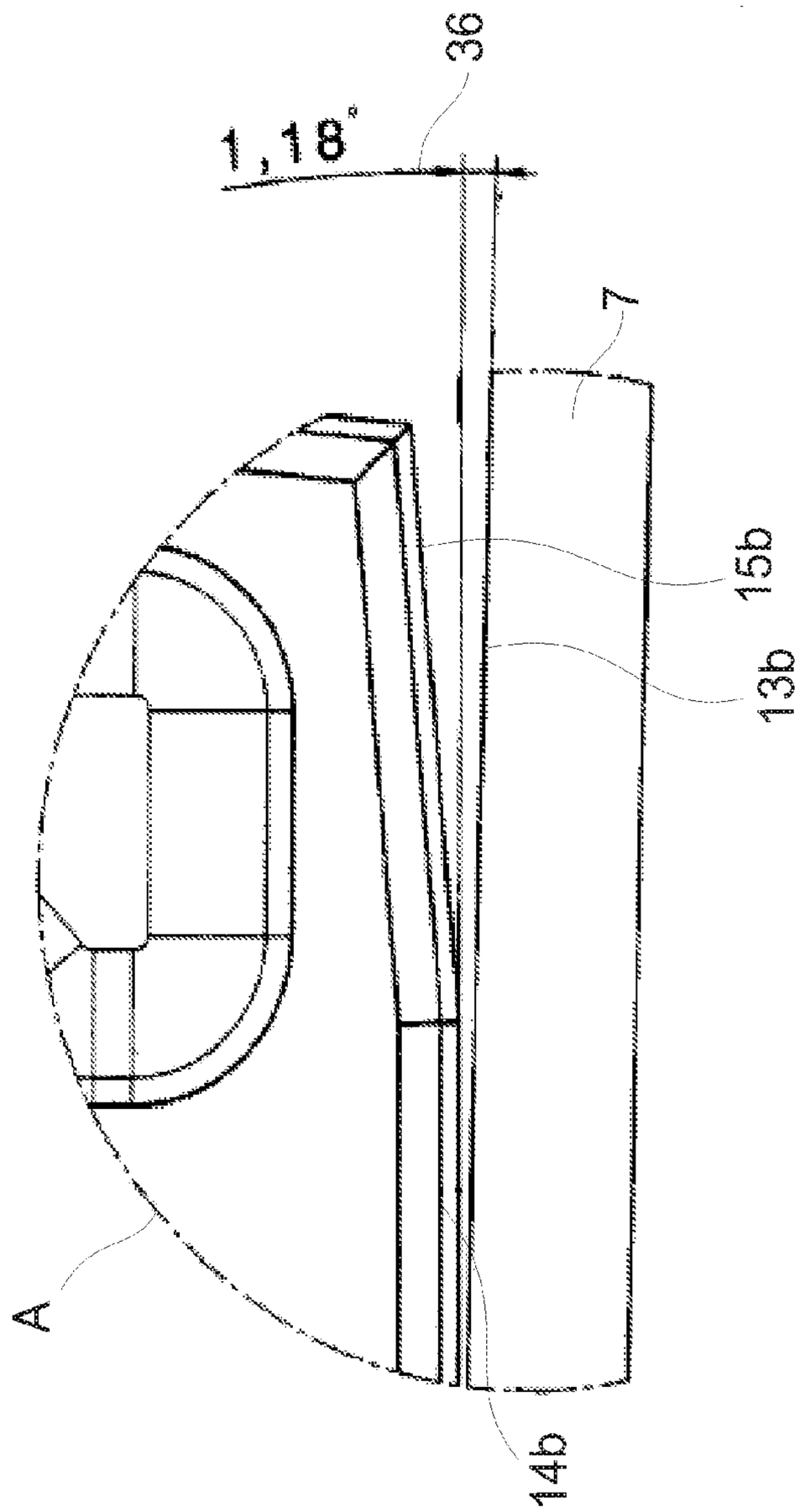
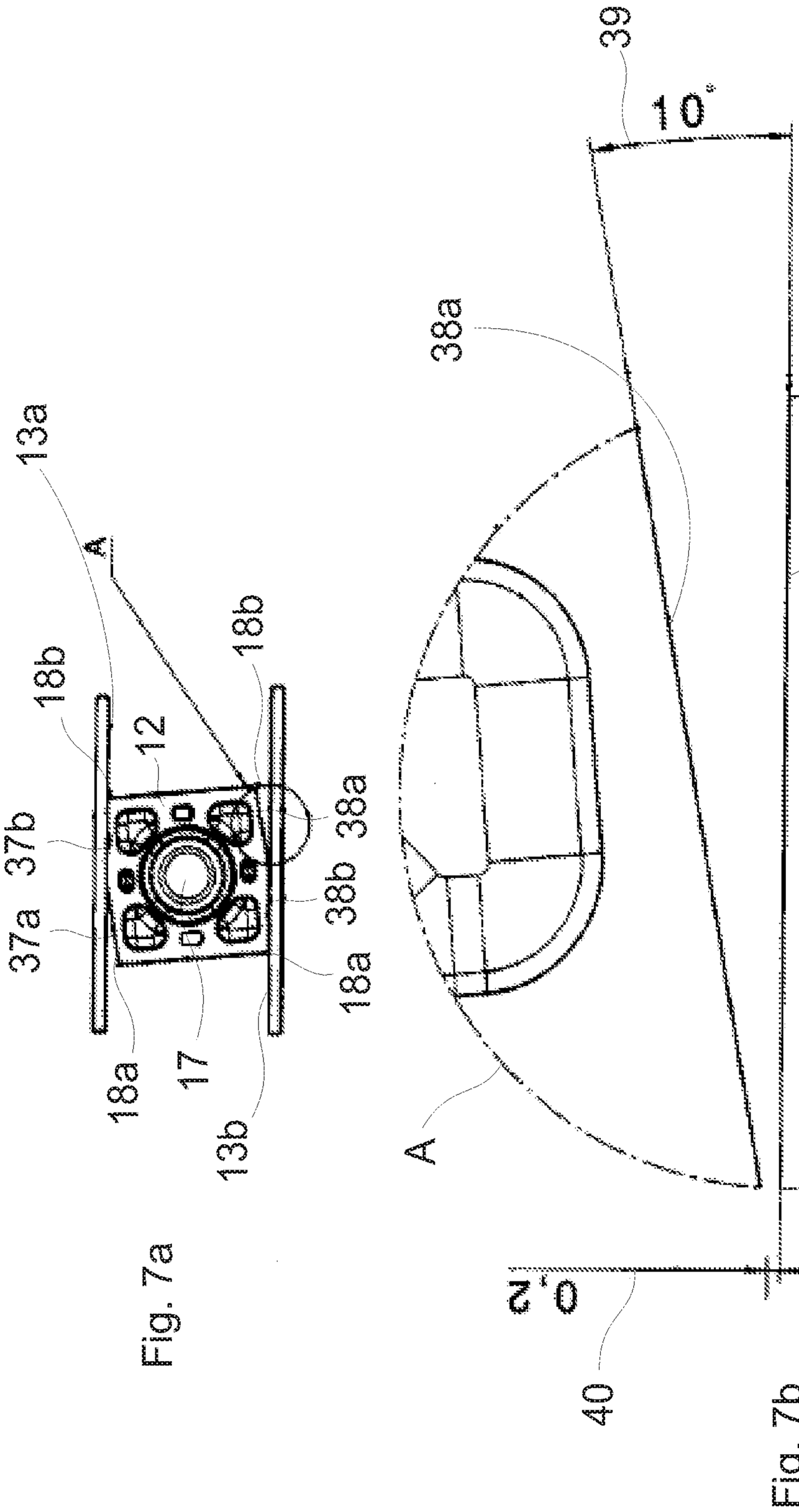


Fig. 6b


13a
A
18b
18b
12
37b
37a
38b
38a
18a
17
13b
Fig. 7a
39
10°
38a
13b
7
A
2°
40
Fig. 7b

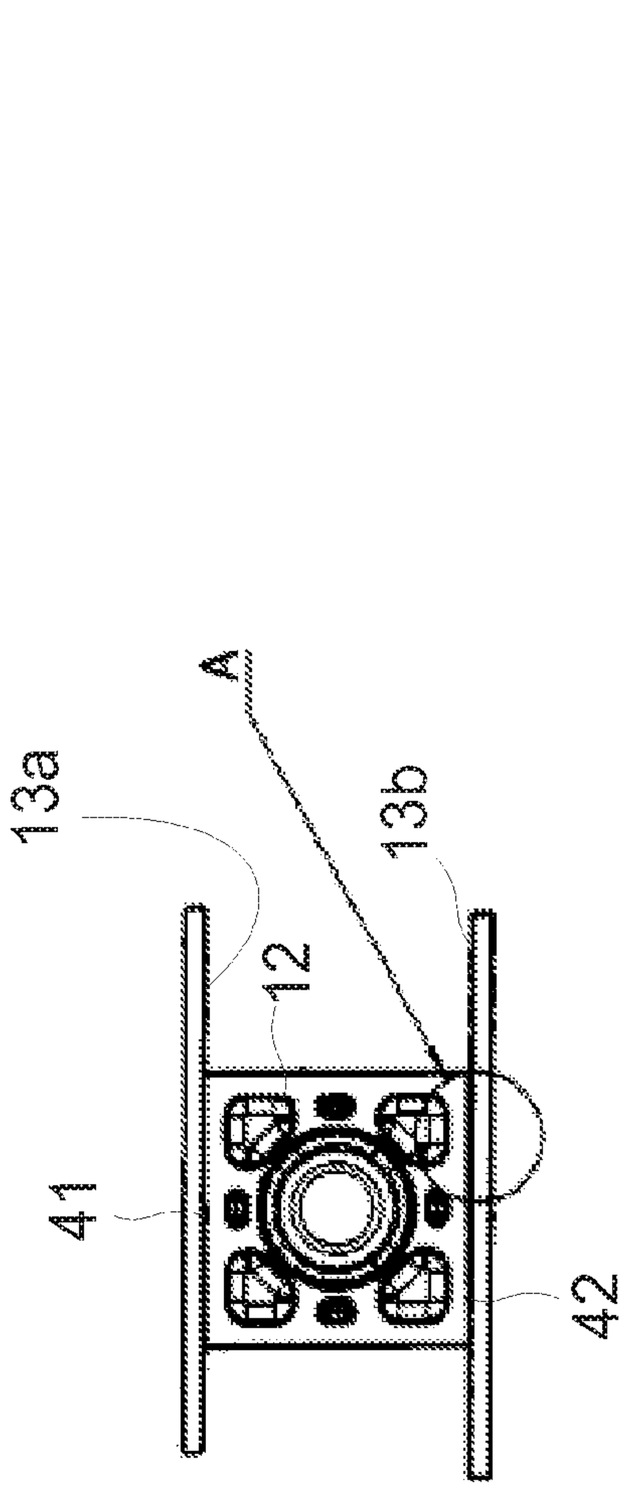


Fig. 8a

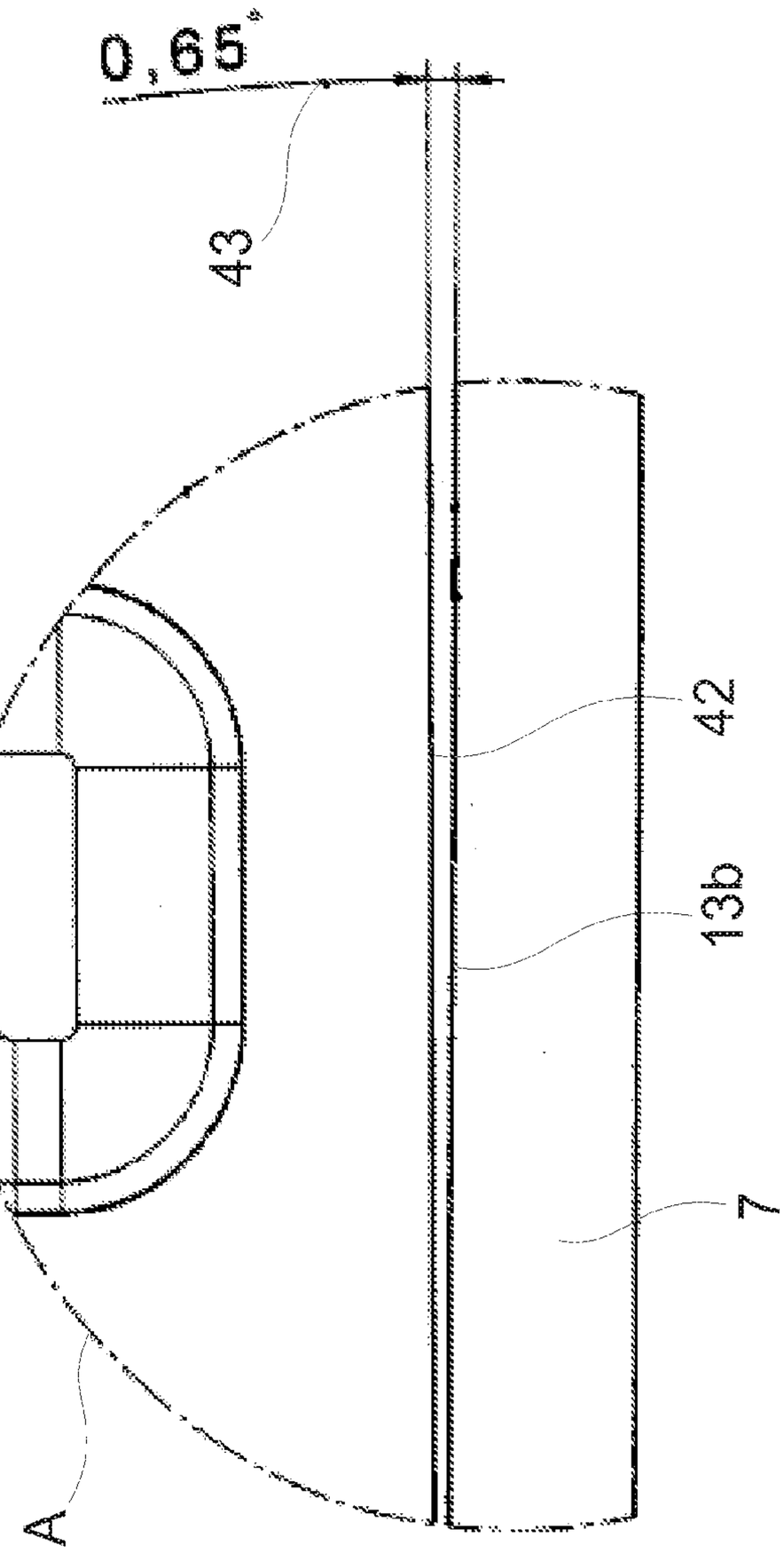


Fig. 8b

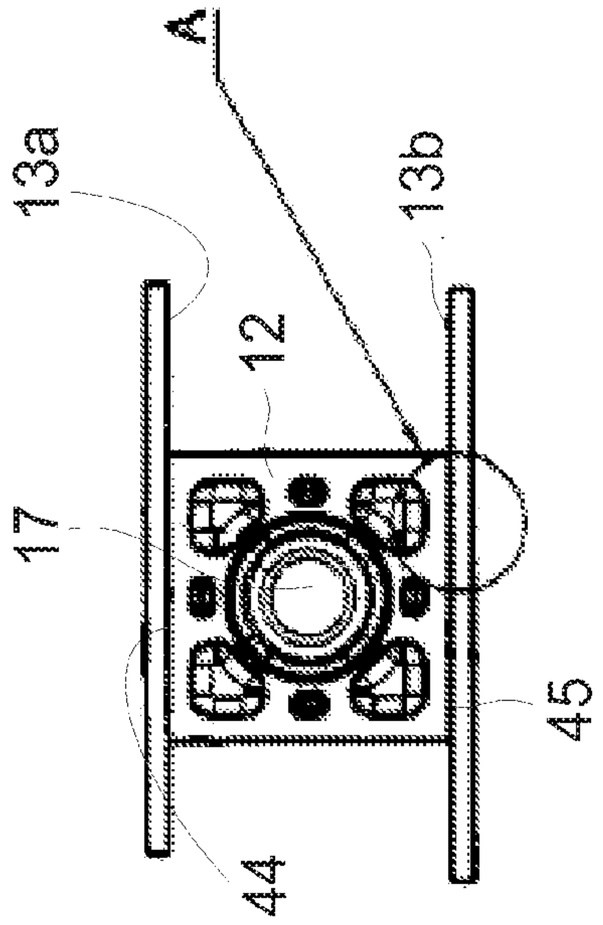


Fig. 9a

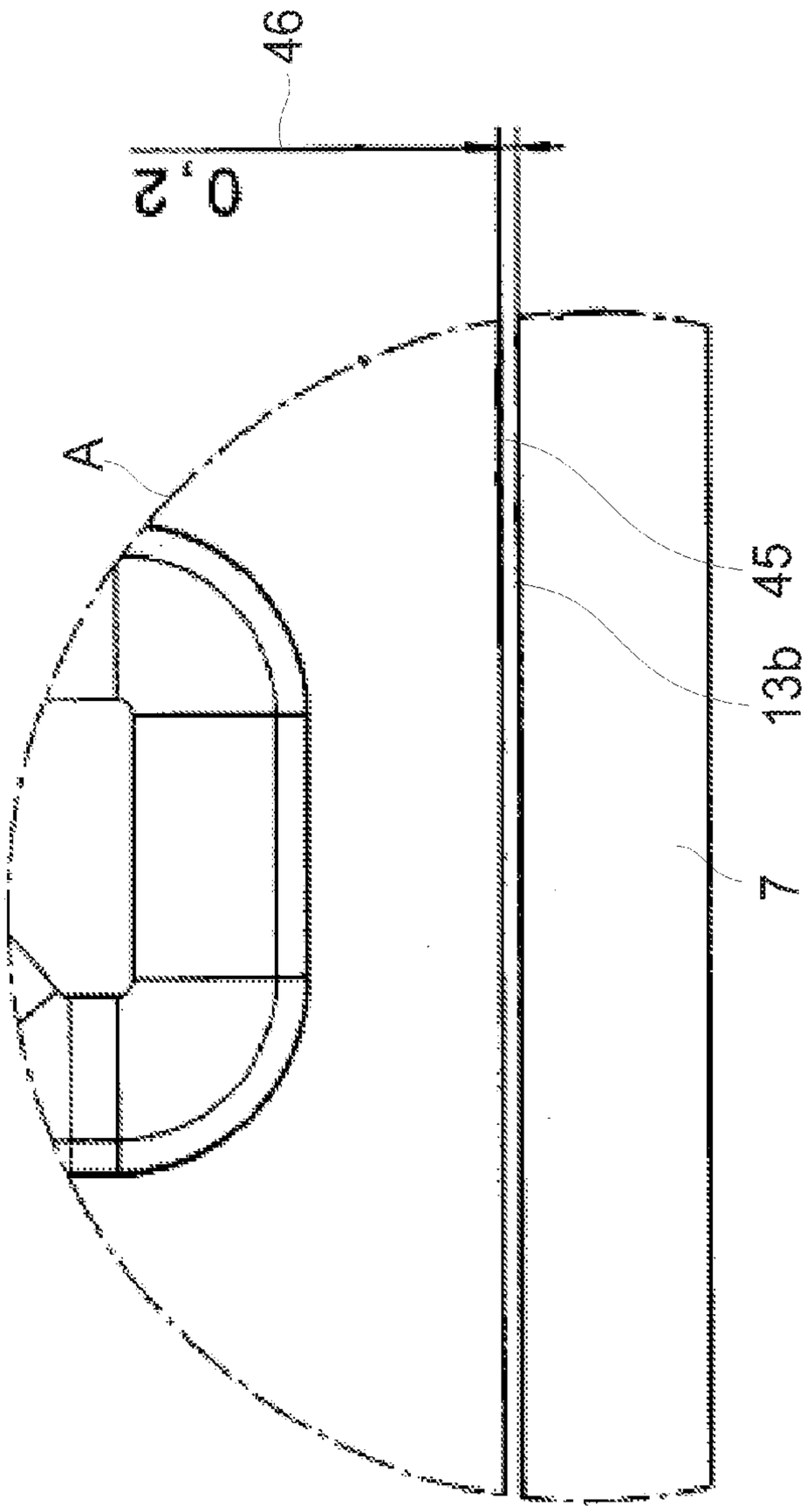


Fig. 9b

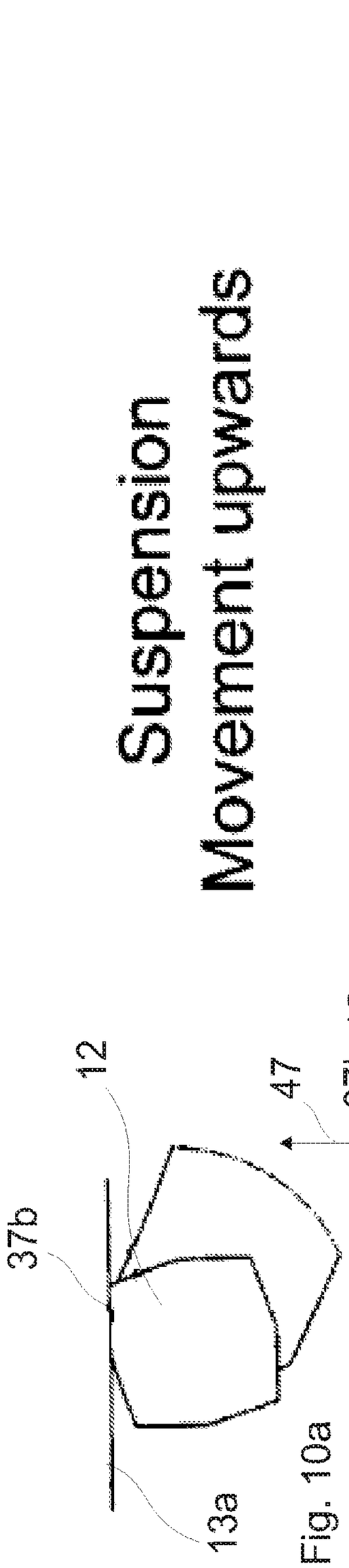


Fig. 10a

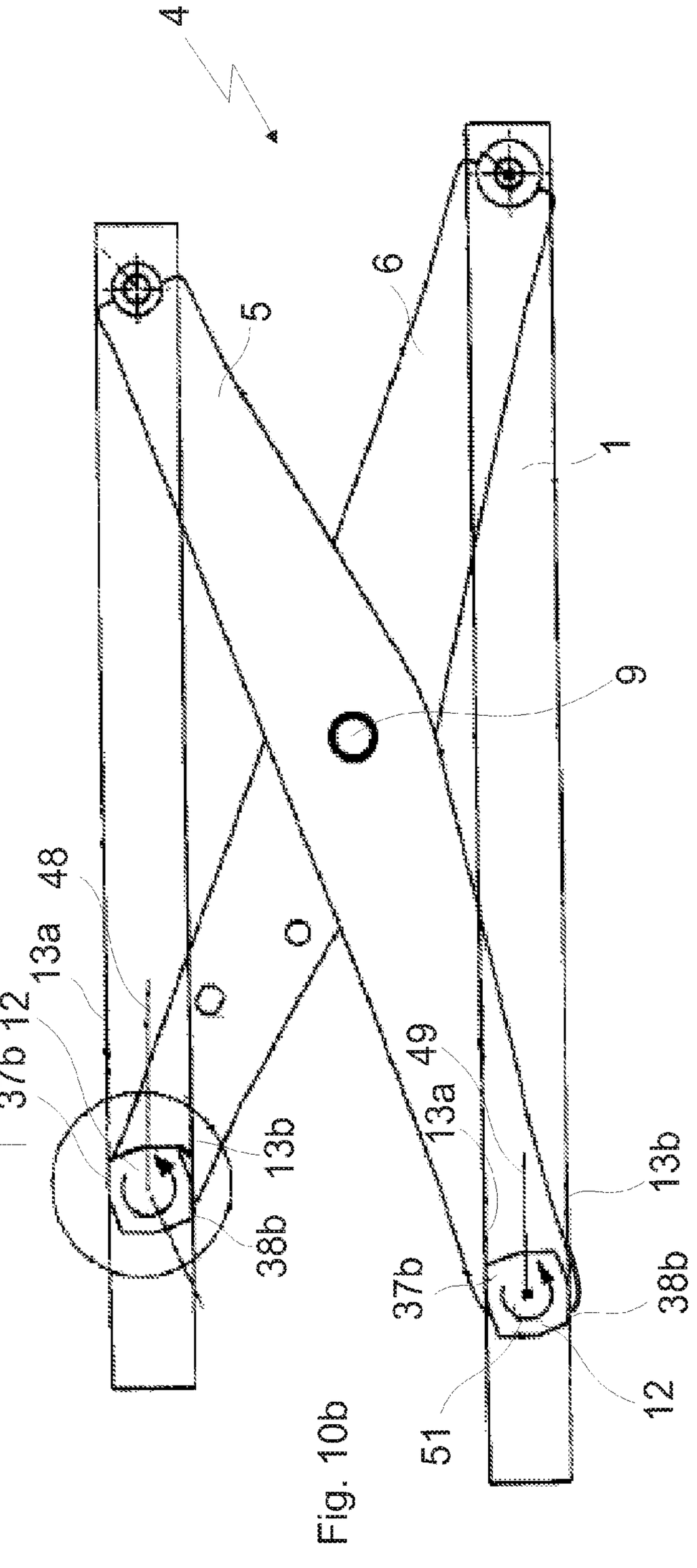


Fig. 10b

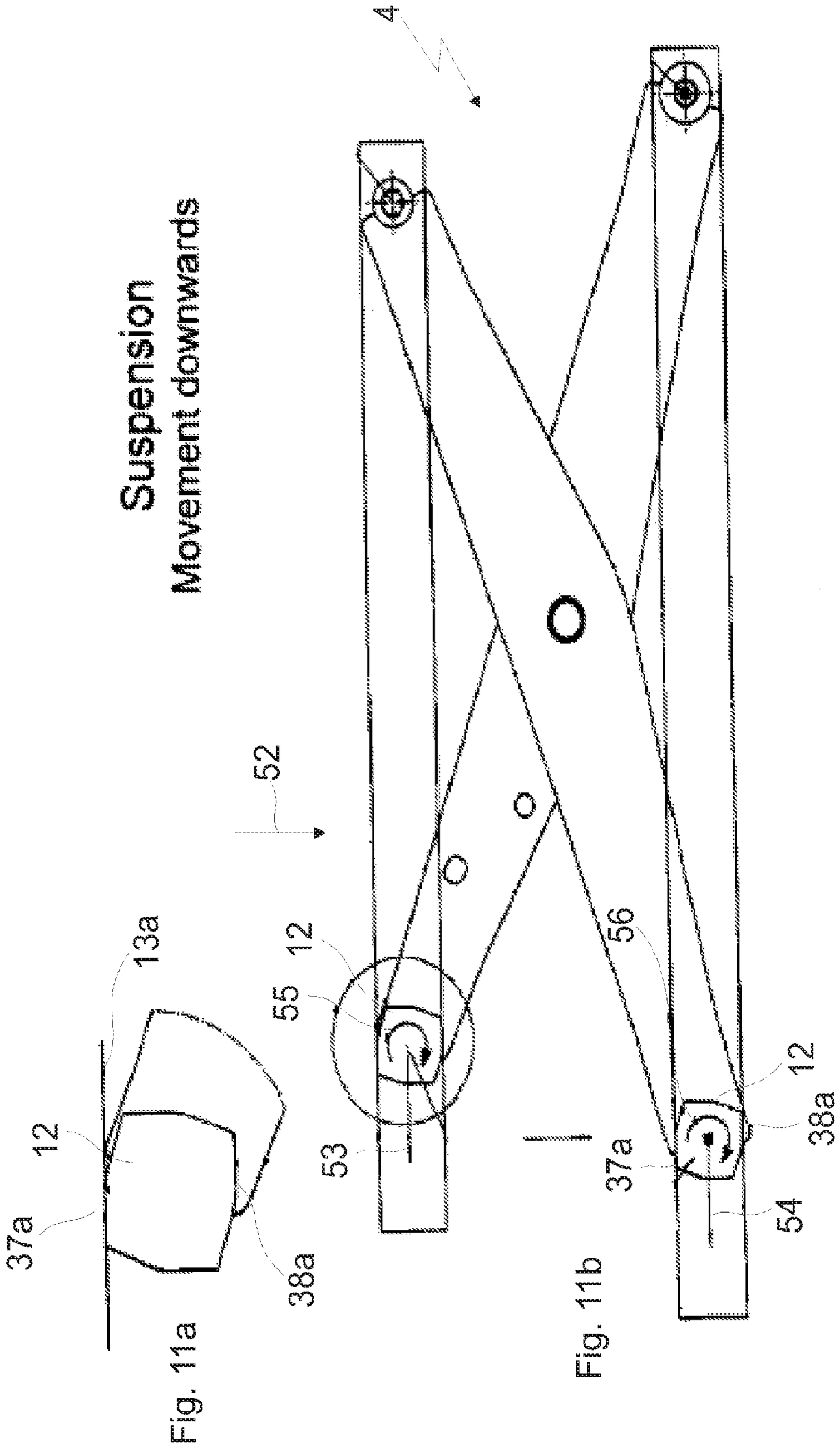


Fig. 11a

Fig. 11b

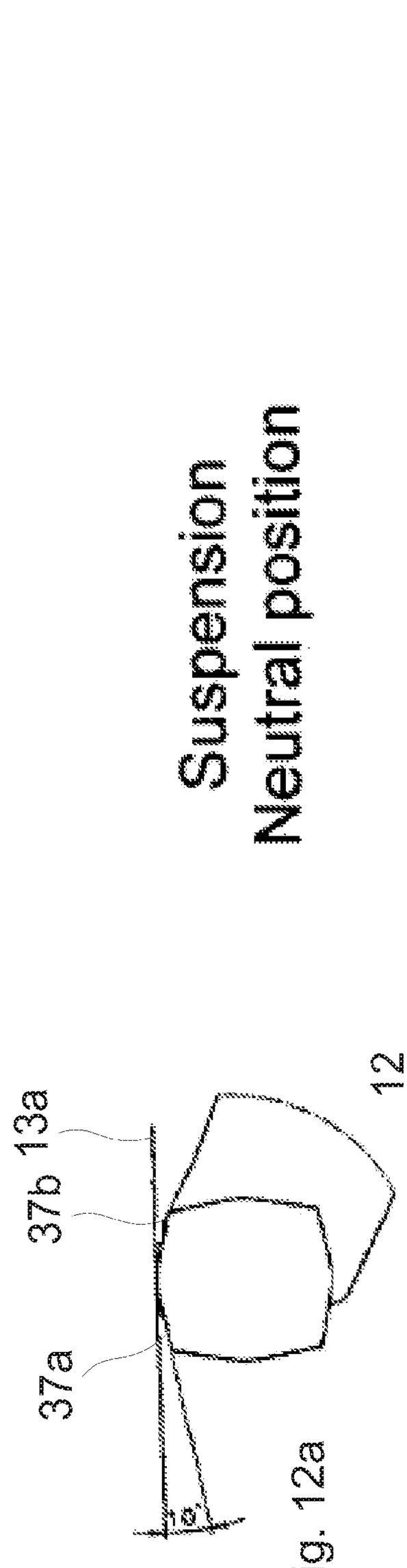


Fig. 12a

Fig. 12b

VEHICLE SEAT WITH SLIDE ELEMENT

CROSS REFERENCE TO RELATED APPLICATION

This application claims the benefit of priority from German Patent Application No. 10 2010 010 290.3, filed on Mar. 4, 2010, which is hereby incorporated by reference in its entirety.

DESCRIPTION

The invention relates to a vehicle seat with an upper seat part comprising a seat part and a backrest, and a lower seat part, in which case a height-adjustable seat frame with at least two scissor arms connected to each other in an articulated manner is arranged between the upper seat part and the lower seat part.

It is customary for vehicle seats frequently to have height-adjustable seat frames which are assembled from two or more scissor arms. In this case the scissor arms are connected to each other in an articulated manner in the middle region thereof, so that they can be extended towards the top and the bottom, which is accompanied at the same time by a displacement of at least one end of each scissor arm, preferably in the horizontal direction.

A displacement in this way in a displacement direction preferably orientated horizontally takes place in such a way that at least one of the ends of the scissor arms has rolls which roll along inside a guide rail which likewise extends preferably horizontally and wherein the scissor arms are connected to the upper seat part at one end and the lower seat part at the other end. An attachment of rolls in this way frequently has the drawback that they have to be produced in an expensive manner since they frequently have to be produced from metal or from plastics material with a metal bearing and have to be connected to the ends of the scissor arms by means of a plurality of assembly steps. In addition, in the event of wear of the rolls and/or the guide rails which are frequently preferably made U-shaped in their cross-section and which surround the rolls, it is necessary to exchange the rolls in a time-consuming and costly manner.

A further drawback is that the rolls as well as the guide rails have to be produced with a high degree of fitting accuracy in order to ensure a virtually clearance-free rolling of the rolls inside the guide rail and thus to make the vehicle seat safe in the event of an accident.

In this way the object of the invention is to make available a vehicle seat with an upper seat part and a lower seat part as well as a seat frame arranged between them, which will allow an inexpensive and rapid production of a seat frame attached between the upper seat part and the lower seat part as well as a rapid assembly of the seat frame with the remaining components of the vehicle seat.

This object is attained according to the features of claim **1**.

An essential aspect of the invention lies in the fact that in the case of a vehicle seat with an upper seat part comprising a seat part and a backrest and a lower seat part, in which case a height-displaceable seat frame with at least two scissor arms connected to each other in an articulated manner is arranged between the upper seat part and the lower seat part, at least one first end of at least one of the scissor arms is connected to at least one slide element for the displacement—sliding in at least one displacement direction—of the first end inside at least one guide rail. On account of the arrangement of slide elements instead of rolls it is advantageously made possible for an inexpensive and rapid production of these elements, for

example of plastics material, which run along the guide rails. In addition, a rapid connection of these slide elements to ends of the scissor arms is made possible.

A slide element of this type advantageously comprises at least one substantially cuboidal element, wherein this element slides with at least two mutually opposed first surfaces along sliding faces **13***a*, **13***b* of the guide rail **7** which preferably has a U-shaped cross-sectional profile along a plane B-B, as shown in FIG. **1**. The arrangement of a cuboidal slide element of this type inside U-shaped guide rails ensures a high degree of security against loosening of the ends of the scissor arms out of the guide rails, even if for example a serious collision occurs. This is because the U-shaped cross-sectional profiles embrace the slide element, which is made cuboidal, on its top side and underside, which represent first surfaces and can even have profiles turned down laterally, so that it is also no longer possible for the slide elements to slide out laterally, i.e. transversely to the displacement direction.

In accordance with a preferred embodiment the first surfaces are designed in such a way that each first surface has a flat first face situated in the central region of the first surface and—as viewed in the displacement direction—at least one flat or curved second face situated behind the first face and at least one flat or curved third face situated in front of the first face.

The second face—as viewed in the displacement direction—is designed to extend sloping from the first face towards a first end of the first surface. The third face, on the other hand—as viewed in a direction opposed to the displacement direction—is designed to extend sloping from the first face towards a second end of the first surface.

The design of such second and third faces prevents tilting of the slide element designed in a cuboidal manner from taking place in the event of displacement of the slide element in the forward and reverse directions, i.e. in the displacement direction.

In fact, on account of these sloping second and third faces, jamming of the slide element can be prevented even in the case of a rapid displacement in the displacement direction inside the guide rail, since when sliding forwards the slide element slides on the upper second face and the lower third face by slight turning of the slide element suspended in an articulated manner and when sliding backwards it slides on the upper third faces and the lower second face. This leads to the slide element not remaining suspended and no jerking taking place, as could happen in the event of tilting of an exactly cuboidal element, if little clearance is present between the sliding faces of the guide rail and the slide element. In this way, tilting and jerking during the displacement movement are prevented by a slight rotation of the slide element which is arranged so as to be rotatable on the first end of a scissor arm by means of a shaft extending perpendicularly to the guide rail.

In accordance with a further development of the invention the first and/or second and/or third face—as viewed perpendicularly to the displacement direction—has or have sloping faces starting from the central region of the face towards edge regions of the element. As a result, it is also possible for an undesired lateral tilting of the slide element to be prevented.

The second and third face can be arranged in the form of a flat face with an angle in a range of from 0.05° to 5.0° with respect to a plane of the sliding face of the guide rail. Such angles, of which 0.2° is preferably used as the angular dimension, have proven successful in their order of magnitude since the non-jamming sliding of the slide elements inside the guide rail, which embrace the slide element at least on the top side and underside, is possible on the one hand and as little

clearance as possible is provided between the sliding faces of the guide rail and the surfaces of the slide element even in a sliding state on the other hand.

In accordance with a further embodiment the first surfaces are designed in such a way that every first surface has two flat faces which—as viewed in the displacement direction—extend sloping from a central region of the first surface towards a first and second end of the first surface. On account of such a design in the manner of a gabled roof—when viewed from the side or in cross-section—of the surface of the slide element, a reduction of the face portions from three or—if faces sloping at the side are desired—nine to a total of two faces or—if faces sloping at the side are desired—also to a total of six face portions respectively.

In contrast to the first embodiment of the invention named above, enlarged sliding faces, namely the fifth faces, are available during a sliding movement and in this respect there is a lower degree of wear as compared with the previously named embodiment with three or nine face portions respectively. In this case it is nevertheless a drawback that a greater degree of clearance has to be present between the sliding faces of the guide rails and the surface of the slide element, since the angle between the fifth faces and a plane of the sliding face of the guide rail has to be selected from a range of from 0.1° to 15.0° in order to ensure a satisfactory operation of the sliding movement.

The slide elements are attached in a rotatable manner in each case to the first end of the scissor arm by at least one shaft, which extends perpendicularly to the guide rail and which is likewise preferably made horizontal, and they engage in a recess which is preferably provided centrally in the slide element to this end and which need not necessarily pass through the whole of the slide element, but extends for example only as far as half the width of the slide element.

Further advantageous embodiments are set out in the subclaims.

Advantages and useful features may be seen in the following description in conjunction with the drawing. In the drawing

FIG. **1** is a diagrammatic illustration of a vehicle seat with a slide element according to the present invention and a cut-away view of this vehicle seat;

FIG. **2** is a side view of the slide element for a vehicle seat according to a first embodiment of the invention;

FIG. **3** is a perspective illustration of the slide element for a vehicle seat according to the first embodiment of the invention;

FIG. **4** is a further perspective illustration of the slide element for the vehicle seat according to a first embodiment of the invention;

FIGS. **5***a* and **5***b* are a side view together with a cut-away illustration of the slide element for the vehicle seat according to the first embodiment of the invention with a first angular setting of the slide element;

FIGS. **6***a* and **6***b* are a side view of the slide element for the vehicle seat according to the first embodiment of the invention with a second angular setting of the slide element;

FIGS. **7***a* and **7***b* are a side view of the slide element for a vehicle seat according to a second embodiment of the invention together with a cut-away illustration;

FIGS. **8***a* and **8***b* are a side view with a cut-away illustration of the slide element for the vehicle seat according to a third embodiment of the invention in a first angular setting of the slide element;

FIGS. **9***a* and **9***b* are a side view and a cut-away illustration of the slide element for a vehicle seat according to the third embodiment of the invention in a second angular setting of the slide element;

FIGS. **10** and **10***a* are a diagrammatic illustration of a frame of the vehicle seat with a slide element of the second embodiment during an upwardly directed movement of the seat frame;

FIGS. **11** and **11***a* are a diagrammatic illustration of the seat frame illustrated in FIGS. **10** and **10***a* during a downwardly directed movement, and

FIGS. **12** and **12***a* are a diagrammatic illustration of the seat frame illustrated in FIGS. **10**, **10***a*, **11** and **11***a* with the associated cut-away views in a neutral position, i.e. without movement.

FIG. **1** is a diagrammatic side view of a vehicle seat **1** together with the slide element according to a first embodiment of the invention, and also a cut-away illustration.

The vehicle seat **1** is formed from the seat part **2** and the backrest **3** and comprises the seat frame **4** which is situated between an upper seat part—which is formed from the seat part **2** and the backrest **3** as well as an upper frame in the manner of a framework which inter alia has a guide rail **7**—and a lower seat part which can likewise be constructed in the manner of a framework or from two separate rails **11**, and inter alia contains a guide rail **8**.

In addition, the seat frame **4** comprises two scissor arms **5**, **6** which are connected to each other in a rotatable manner by means of a shaft which preferably extends transversely to the direction of the vehicle seat or the sitting direction of the person who is using the vehicle seat.

The scissor arms **5**, **6** can be connected in a fixed manner at their rear end or—as viewed in the plane of the drawing—at their right-hand end to the lower seat part rail **11** and a portion of the upper seat part with which the guide rail **7** is associated. Alternatively, they can be displaceable in the displacement direction **10** and in a direction opposed to the displacement direction **10**. A fixed locking of at least the right-hand or rear end of the scissor arm **6** is preferred.

According to the invention a front end **5***a* and **6***a* of the scissor arms **5**, **6** is connected to slide elements **12** and can be displaced in the displacement direction **10** or in a direction opposed to the displacement direction **10** by means of these slide elements which are preferably produced from plastics material and which have a high degree of hardness. This is necessary if the seat is to undergo height-displacement, i.e. the two scissor arms are to be deflected towards the top or the bottom and are thus also to be displaced in the direction of the displacement direction or in a direction opposed to this displacement direction by means of the slide elements.

As shown in a cut-away illustration A in FIG. **1**, the slide element inside the guide rail **7** is reproduced in an enlarged illustration. It is evident from this illustration that the slide element slides with its upper surface and its lower surface along sliding faces **13***a* and **13***b* of the guide rail if it is displaced backwards and forwards or—as viewed in the plane of the drawing—to the left and the right.

The slide element, which is preferably produced from hard plastics material in order to have satisfactory sliding properties with respect to the guide rail **7** and **8** which is preferably produced from metal, is illustrated in a side view in FIG. **2**. The slide element **12**, which has a substantially cuboidal shape, has according to the invention machined first surfaces **18** which are arranged so as to slide at the top and bottom along sliding faces of the guide rails, and surfaces **19** which are arranged at the front and the rear, as viewed in the direction of the vehicle seat. In this case it should be noted that the

front and rear surfaces **19** have a similar machining to the surfaces **18** situated at the top and bottom, even if the surfaces **19** situated at the front and the rear are not used as sliding faces in order to ensure freedom from assembly errors. In this way, even if the cuboidal slide element is inserted inadvertently turned through 90° into the guide rail during assembly, it will remain fully functional. This applies to all the embodiments described in this patent application.

It is evident from the side view—reproduced in FIG. **2**—of the slide element for a vehicle seat according to the first embodiment of the invention that the first surfaces **18** with a first end **18***a* and a second end **18***b* have a central first face **14***a* and **14***b* which—if the vehicle seat momentarily has a horizontal orientation—are likewise orientated horizontally. Starting from these central first faces **14***a* and **14***b*—as viewed in the displacement direction **10**—a second face **16***a* and **16***b* is arranged behind the first flat face **14***a* and **14***b* which constitutes a slope of the cuboidal element and thus slopes starting from the first face **14***a* and **14***b* in the direction of the first end **18***a* of the first surface **18**.

A third face **15***a* and **15***b* is likewise arranged which—as viewed in the displacement direction—is arranged in front of the first face **14***a* and **14***b* and extends in a sloping manner starting from the first face **14***a* and **14***b* in the direction of the second end **18***b* of the first surface **18**.

As a result of the design of these three faces **14***a*, **15***a* and **16***a*, and **14***b*, **15***b* and **16***b* respectively it is advantageously made possible for the slide element to be able to rotate slightly during the displacement movement about a shaft, which is mounted centrally in a recess **17** in the slide element, without in this case becoming stuck inside the guide rail which is preferably made U-shaped in cross-section or without becoming jammed inside this guide rail. This is because a rotation which takes place in the horizontal direction on account of the displacement force will result in sliding of the slide element on the faces **15***b* and **16***a* during a displacement movement directed forwards in the displacement direction **10** and sliding on the faces **15***a* and **16***b* during a displacement movement directed in a direction opposed to the displacement direction **10**. This always ensures, in a reliable manner, sliding between the sliding faces **13***a* and **13***b* of the guide rail and the slide element **12** whilst retaining a slight clearance or interspace or play between the sliding faces of the guide rail and the surfaces **18** of the slide element.

It is evident from the side view—shown in FIG. **2**—of the slide element according to the first embodiment and the perspective illustration as reproduced in FIG. **3**, that the front and rear surfaces of the slide element likewise have a tripartite division of the surface. This ensures not only an error-free assembly, even if the slide element is inadvertently turned through 90° into the guide rail during assembly, but it is also made possible for a subsequent turning of the slide element through 90° after wear of the sliding surfaces **18** has taken place through 90°, so that the sliding surfaces **19** are now turned upwards and downwards and extend along the sliding faces **13***a* and **13***b* of the guide rail.

As a result, it is evident from the illustrations of FIGS. **2** and **3** that a front side directed towards the front and a rear side directed towards the rear likewise have a first face **20***a* and **20***b* situated in the central region of the surface **19** as well as a second face **21***a* and **21***b* and a third face **22***a* and **22***b*. The second and third faces **21***a*, **21***b* and **22***a*, **22***b* are in turn designed so as to slope, starting from the first face **20***a*, **20***b*, towards the end regions at the edge of the surfaces **19**.

It is additionally evident from FIG. **3** in this perspective illustration that the surfaces **20***b*, **21***b* and **22***b* as well as the surfaces **14***a*, **15***a*, **16***a* as well as **14***b*, **15***b* and **16***b* and **20***a*, **21***a*, **22***a* can have fourth faces **23***b*, **24***b* and **25***b* as well as **23***a*, **24***a* and **25***a* sloping towards the lateral edge of the slide element.

These faces which slope towards the lateral edge regions of the slide element advantageously make it likewise possible for jamming in the lateral direction and simplified assembly of the slide element into the guide rail to take place. In addition, during the sliding movements this makes it possible for contamination caused by particles or chips resulting from the wear of the sliding faces to be forced into the lateral regions between the sliding faces **13***a* and **13***b* of the guide rail as well as the faces **23***a*, **24***a*, **25***a* as well as **23***b*, **24***b*, **25***b*, without obstructing the actual sliding movement or obstructing or impairing the actual sliding faces **20***b*, **21***b* and **22***b* or—transferred to the other faces—**14***a*, **15***a* and **16***a* as well as **14***b*, **15***b* and **16***b*.

In addition, in order to save weight and for stabilization purposes the slide element has recesses **26**, **27** which can be designed in any desired manner.

The slide element for the vehicle seat in the first embodiment is shown in FIG. **4** in a further diagrammatic illustration. It is evident from this illustration too that all the surfaces **18**, **19** can have not only the sliding first, second and third faces **14***a*, **15***a*, **16***a* as well as **20***a*, **21***a* and **22***a* situated centrally with respect to the longitudinal axis of the surface **18**, **19**, but also faces **31***a*, **32***a* and **33***a* as well as **31***b*, **32***b* and **33***b* or **28***a*, **29***a* and **30***a* as well as **28***b*, **29***b* and **30***b* sloping laterally towards the edges.

The first faces **14***a* or—as is evident from this illustration according to FIG. **4**—**20***a* can be for example a face situated centrally and with a dimension of 7 mm by 7 mm.

A side view and a cut-away illustration with the slide element for a vehicle seat according to the first embodiment are shown in FIGS. **5***a* and **5***b*. FIG. **5***a* shows in a diagrammatic illustration that the slide element **12** of a guide rail is arranged between the sliding faces **13***a* and **13***b* and momentarily has a rotational position with an angle of 0° provided with respect to the shape of the extension plane of the sliding faces **13***a*, **13***b*.

A shaft (not shown in detail in this case), which is connected to first ends **5***a*, **6***a* of the scissor arms **5**, **6** and which arranges the slide element on the first end in a pivotable manner, is arranged inside the recess **17**.

It is likewise evident from this illustration that the first faces **14***a* and **14***b* are momentarily in direct contact with the sliding faces **13***a* and **13***b* of the guide rail.

In the enlarged illustration A as shown in FIG. **5***b* it is shown that the first face **14***b* in this angular setting of the slide element is momentarily at a distance from the sliding face **13***b* of the guide rail with a play **34** of 0.2 mm for example. A third face **15***b* is at an angle with respect to the first face **14***b* and in this angular setting of 0° with respect to the guide rails the slide element is not in contact with the sliding face **13***b*.

In FIGS. **6***a* and **6***b* the slide element for the vehicle seat according to the first embodiment is shown in similar illustrations to FIGS. **5***a* and **5***b*, with the exception of the fact that the slide element is now in an angular setting with an angle of 1.18° as shown by the reference number **35** with respect to the plane of the sliding faces **13***a*, **13***b*, as can occur during a sliding movement.

In the illustration A enlarged in FIG. **6***b* it is shown that the first face **14***b* is now arranged at an angle **36** in the order of magnitude of 1.18° with respect to the sliding face **13***b* of the guide rail **7**. Although the third face **15***b* is still at a greater distance from the sliding face **13***b* of the guide rail **7**, a second face **16***b* (not shown in detail in this case) is now in contact with the sliding face **13***b* to an increased degree, since—as

viewed in the plane of the drawing—the slide element **12** is pivoted towards the left. This permits a jamming-free sliding of the slide element and at the same time the use of the largest possible sliding faces on account of the design of the slide element according to the invention with respect to the surfaces thereof.

The slide element for a vehicle seat according to a second embodiment of the invention is shown in FIGS. **7***a* and **7***b*. This slide element **12** differs from the slide element shown in FIGS. **5***a*, **5***b* and FIGS. **6***a* and **6***b* in that the first surfaces **18** are made, not tripartite, but bipartite in their shape. This means that fifth faces **37***a*, **37***b* or **38***a* and **38***b* respectively are arranged in such a way that in an angular setting of the slide element **12**, as shown in this case by the reference number **39** with an angle of 10°, a sliding on the two faces **37***b* and **38***b* takes place. If, however, the displacement movement of the slide element takes place in the opposite direction, then sliding on the faces **37***a* and **38***a* will take place.

It is likewise evident from the illustrations as shown in FIGS. **7***a* and **7***b* that a play **40** between the sliding face **13***b* and the surface **18** with the fifth face portion **38***b* of 0.2 mm according to the reference number **40** can be present.

The slide element for a vehicle seat according to a third embodiment of the invention is shown in a side view and in a cut-away illustration in FIGS. **8***a* and **8***b*. The slide element according to this embodiment differs from the previously described embodiments in that the first surfaces **18** are formed in one part only with respect to their sliding faces, i.e. there is not a plurality of face portions which are arranged converging at an angle but only one face **41** and **42**. In the case of an angular setting **43** of for example 0.65° the face **42** of the first surface would then be arranged at an angle with respect to the sliding face **13***b* of the guide rail.

In the case of an angle of 0° on the other hand, as is shown in the illustration according to FIGS. **9***a* and **9***b*, the two surfaces **44** and **45** are spaced at approximately the same distance or play **46** of for example 0.2 mm with respect to the sliding faces **13***a* and **13***b* of the guide rails.

The seat frame with slide elements according to the second embodiment of the invention during an upwardly directed movement of the seat frame is shown in a diagrammatic illustration in FIG. **10**. The seat frame **4** has the parts already specified. During an upwardly directed movement in accordance with the arrow **47** the slide elements **12** slide on their faces **37***b* and **38***d* along the sliding faces **13***a* and **13***b* of the guide rail. During this upwardly directed movement the slide elements **12** are displaced towards the right—as viewed in the plane of the drawing—in accordance with the arrows **48** and **49**. This leads to a rotation of the slide elements in accordance with the arrows **50** and **51**.

An enlarged illustration of a slide element **12** with respect to the sliding face of the guide rail is shown in FIG. **10***a*.

The seat frame **4** during a downwardly directed movement in accordance with the arrow **52** is shown in a diagrammatic illustration in FIG. **11**. In this case the slide elements **12** slide towards the left—as viewed in the plane of the drawing—in accordance with the arrows **53** and **54**. This has the result that a rotation of the slide elements **12** in accordance with the arrows **55** and **56** takes place in the opposite direction with respect to the rotation shown in FIG. **10**.

A cut-away view of a slide element in this position with respect to the sliding face **13***a* of the guide rail is shown in FIG. **11***a*. In this case the sliding faces **37***a* and **38***a* are in contact with the sliding faces of the guide rail.

The seat frame as shown in FIGS. **10** and **11** is shown in a neutral position, i.e. without movement, in a diagrammatic illustration in FIG. **12**. In this position the slide elements **12** are in contact neither with the sliding face **37***a* nor with the sliding face **37***b* or with the sliding face **38***a* and **38***b* as well as with the sliding faces **13***a* and **13***b* of the guide rail. This is also evident from the enlarged illustration in FIG. **12***a*.

All the features disclosed in the application documents are claimed as being essential to the invention, insofar as they are novel either individually or in combination as compared with the prior art.

LIST OF REFERENCES

1 vehicle seat
2 seat part
3 backrest
4 seat frame
5, **6** scissor arms
5*a*, **6***a* front end of the scissor arms
7, **8** guide rail
10 displacement direction
11 separate rails
12 slide element
13*a*, **13***b* sliding faces of the guide rail
14*a*, **14***b* first faces
15*a*, **15***b* second faces
16*a*, **16***b* third faces
17 recess
18 first surface
18*a* first end
18*b* second end
19 front and rear surfaces
20*a*, **20***b* first faces
21*a*, **21***b* second faces
22*a*, **22***b* third faces
23*a*, **23***b* fourth faces
24*a*, **24***b* faces
25*a*, **25***b* faces
34 play
35, **36** angle
37*a*, **37***b* fifth faces
38*a*, **38***b* fifth faces
39 angle
40 play
41, **42** face
43 angular setting
44, **45** surfaces
46 play
47, **48**, **49**, **50**,
51, **52**, **53**, **54**,
55, **56** arrows

The invention claimed is:

1. A vehicle seat with an upper seat part (**2**, **3**) comprising a seat part (**2**) and a backrest (**3**) and a lower seat part (**11**), wherein a height-adjustable seat frame (**4**) with at least two scissor arms (**5**, **6**) connected to each other in a rotatable manner is arranged between the upper seat part (**2**, **3**) and the lower seat part (**11**), characterized in that at least one first end (**5***a*, **6***a*) of at least one of the scissor arms (**5**, **6**) is connected to at least one slide element (**12**) for the displacement of the first end (**5***a*, **6***a*) along at least one guide rail (**7**), wherein the slide element (**12**) is at least one substantially cuboidal element (**12**), which slides with at least two mutually opposed first surfaces (**18**) along sliding faces (**13***a*, **13***b*) of the guide rail (**7**) characterized in that each first surface (**18**) has a flat first face (**14***a*, **14***b*) situated in a central region of the first surface (**18**) and at least one flat or curved second face (**16***a*, **16***b*) situated proximal to the first end (**5***a*, **6***a*) of the scissor arm (**5**, **6**) and at least one flat or curved third face (**15***a*, **15***b*)

situated distal to the first end (**5***a*, **6***a*) of the scissor arm (**5**, **6**), wherein the first, second and third faces are arranged linearly, wherein one of the faces (**37***a*, **37***b*, **38***a*, **38***b*) is arranged in such a way that in an angular setting of the slide element (**12**) a sliding on said face (**37***a*, **37***b*, **38***a*, **38***b*) will take place, and wherein second surfaces (**19**) which are arranged in the front and the rear of the slide element (**12**) and substantially perpendicular to a longitudinal axis of the guide rail (**7**) have a similar shape to the first surfaces (**18**).

2. The vehicle seat according to claim **1**, characterized in that the second face (**16***a*, **16***b*) extends sloping from the first face (**14***a*, **14***b*) towards a first end (**18***a*) of the first surface (**18**).

3. The vehicle seat according to claim **2**, characterized in that the third face (**15***a*, **15***b*) extends sloping from the first face (**14***a*, **14***b*) towards a second end (**18***b*) of the first surface (**18**).

4. The vehicle seat according to any one of claim **2**, characterized in that at least one of the first, second and third faces (**14***a*, **14***b*; **15***a*, **15***b*; **16***a*, **16***b*) has a sloping face (**31***a, b*; **32***a, b*; **33***a, b*) starting from the central region of the face (**14***a, b*; **15***a, b*; **16***a, b*) towards edge regions of the first surface (**18**) of the slide element (**12**).

5. The vehicle seat according to any one of claim **2**, characterized in that the second and third faces are arranged in the form of flat faces (**15***a, b*; **16***a, b*) with an angle (**34**) in a range of from 0.05° to 5.0° with respect to a plane of the sliding face (**13***b*) of the guide rail (**7**).

6. The vehicle seat according to claim **1**, characterized in that each first surface (**18**) has two flat faces (**37***a*, **37***b*; **38***a*, **38***b*) which extend sloping from a central region of the first surface (**18**) towards a first and second end (**18***a*, **18***b*) of the first surface (**18**).

7. The vehicle seat according to claim **6**, characterized in that the flat faces (**37***a*, **37***b*; **38***a*, **38***b*) are arranged at an angle (**39**) in the range of from 0.1° to 15.0° with respect to a plane of the sliding face (**13***b*) of the guide rail (**7**).

8. The vehicle seat according to claim **1**, characterized in that the slide element (**12**) is connected in a rotatable manner to the first end (**5***a*, **5***b*) of the scissor arm (**5**, **6**) by means of a shaft which extends perpendicularly to the guide rail (**7**) and which is arranged in a recess (**17**) in the slide element (**12**).

9. The vehicle seat according to claim **1**, characterized in that the guide rail (**7**) has a U-shaped cross-sectional profile within a plane (B-B) perpendicular to a longitudinal direction of the guide rail (**7**).

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